Dr. Ernest William Goodpasture has been appointed assistant professor of pathology at the Harvard Medical School.

Mr. R. S. Troup, assistant inspector-general of forests, India, has been elected professor of forestry at Oxford.

At the University of Lyons, Dr. Mouriquand has been appointed professor of general pathology and therapeutics in place of Professor Lesieur, deceased, and Dr. Policard has been appointed professor of general anatomy and histology in place of Professor Renaut, who has retired from active service.

DISCUSSION AND CORRESPONDENCE

AN UNUSUAL FORM OF RAINBOW

The following is an account of a rainbow which, although probably simple enough in theory, was entirely new to the writer and seems to be worthy of record. The refracting spheres were neither falling raindrops nor drops suspended in air. They were drops resting on the surface of a lake but kept from breaking through the lake surface by a surface tension effect. They probably resulted from a fog which had hung over the lake during the night and persisted longer than usual after sunrise. The morning was unusually calm, and no ripples had yet appeared on the lake. The floating drops gave the surface an appearance like that caused by a scum, but close examination showed the individual drops quite distinctly and also showed that the light of the bow undoubtedly came from them, for part of the bow came quite close to the observer.

The bow was seen about nine o'clock according to the daylight-saving bill, or eight by the usual local railroad time. Its appearance was about as shown in the accompanying figure. AB is the western shore-line of the lake, about 200 yards away. The bow was complete except in the following particulars: the part near S was hidden by the shadow of the observer and that of the boat in which he sat; and the part PRQ was inverted, like a reflection of what should have been the crest, the part near R being somewhat less bright than the rest. The ends of this inverted portion seemed to meet the ends of the larger arc at the shore-line, but there is no reason why such an accidental line should determine the intersection of the two

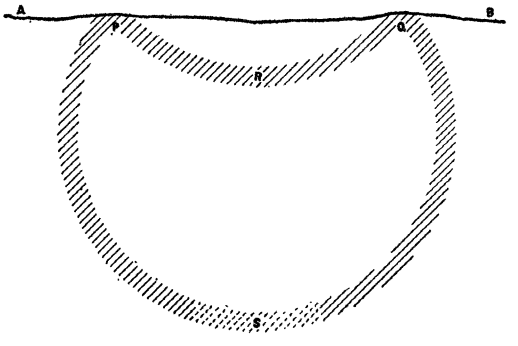

Fig. 1.

branches. Probably they should meet at the horizon. Owing to the closeness of the observer's eye to the water-level, and the distance of the shore-line, the latter would differ in angular position very slightly from the true horizon. Though the bow was very brilliant, no trace of a second bow was visible.

The obvious explanation of the inverted portion is that it is formed by reflection in the lake surface, either directly before or directly after the light passes through the drop. If the light enters the top of the drop and is afterward reflected from the lake-surface, the reflected ray will clear the drop if the elevation of the sun is greater than 21°.6. If it is first reflected from the lake and then enters the drop at the angle of incidence proper to give rise to minimum deviation, the sun's elevation must be less than 20°.4 in order for the incident ray to clear the drop. These figures are calculated on the assumptions that the drop is spherical, that it rests on the surface, and that the angle of the bow is that given by the elementary rainbow theory.

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A SIMPLE DEVICE FOR ILLUSTRATING OSMOSIS

The difficulty of preparing a "leak-proof" apparatus to demonstrate osmosis by the use of parchment and thistle tube, led me, last

year, to experiment with other animal membranes. As a result I found that the method outlined below proved uniformly satisfactory.

The skin of a freshly killed or of a preserved frog was cut at the junction of leg and trunk. This cut, entirely encircling the leg, permitted the skin of the leg to be peeled off precisely as a glove is removed from the hand. At the knee joint it was necessary to proceed carefully to avoid tearing the skin. Having pulled the skin off as far as the foot, the bones and sinews were cut. The result was a leg-shaped sac, open at the top, containing the bones of the foot at its lower end, and entirely free from perforations. The sac was pulled over the end of a glass tube about twelve inches long, and securely fastened by several turns of strong thread. A strong solution of dextrose was poured into the open end of the tube, and the tube shaken until the liquid passed, drop by drop, down into the sac. This process was continued until the liquid stood about an inch high in the tube. The apparatus was supported in such a way that the sac of skin was completely immersed in a tumbler of water. The level of the liquid was recorded by putting a small label on the tube, and the apparatus was ready for demonstration.

The apparatus and procedure described above have the following advantages over any other method that I have seen:

1. *Simplicity.*—Parts are to be found in any biological laboratory. Entire apparatus can be set up in fifteen minutes.

2. *Reliability.*—It is a very simple matter to secure a water-tight junction of the sac and tube by taking several turns of thread and tying the sac tightly to the tube.

3. *Rapidity of Action.*—Since there is a large surface exposed to osmotic action, the rise of the liquid in the tube is rapid. It is not uncommon to note a rise of one centimeter in twenty minutes. This is a valuable point, for it makes possible the recording of data and results in the same laboratory period. A narrow label may be fastened to the tube to mark the level of the liquid at the beginning of the hour. The data are given the pupil, a sketch of the apparatus is made, and by that time the liquid has risen enough to make possible the recording of the new level and the drawing of conclusions. After the contents of the tumbler have been tested with Fehling's solution, pure water may be substituted, and the experiment repeated.

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WHY NOT GOVERNMENT-MAINTAINED FELLOWSHIPS?

IN recent number of SCIENCE,[1] Mr. E. W. Nelson has called attention to the many opportunities that exist in Washington for research in connection with the various government bureaus. To the end that these opportunities may be more widely appreciated he suggests a closer cooperation between the universities and these bureaus and he suggests that universities might find it possible to maintain fellowships which would permit their holders to work at Washington.

That such opportunities exist is undeniable and there are doubtless a very large number of workers who would be extremely glad to take advantage of them, but that any university will be able to establish even a single fellowship of this type is almost too much to hope for. The number of fellowships of even the ordinary character is still far too few. However, there is another angle from which the matter may be approached.

Why should not the federal government itself maintain a group of such fellowships? The presence in Washington of the Congressional Library, the National Museum and the various government bureaus has at times been used as an argument in favor of the establishment there of a National University. Whether such a university should be established is perhaps debatable and whether if it were established it could effectively utilize these special opportunities is more so. In fact it probably could not. But in the absence of such an institution, or perhaps even in addition to it,

[1] Nelson, E. W., "Cooperation between Zoological Laboratories and the Government Bureaus," SCIENCE, XLIX., 409, 1919.